

=> d que 135

L2	90	SEA FILE=REGISTRY ABB=ON	PLU=ON	C7H8N2O5S/MF
L3	88	SEA FILE=REGISTRY ABB=ON	PLU=ON	L2 AND 1/NR
L4	2	SEA FILE=REGISTRY ABB=ON	PLU=ON	L3 AND DIAMI?
L11	17	SEA FILE=HCAPLUS ABB=ON	PLU=ON	CARBOXYPHENYLPHOSPHONIC?
L12	1	SEA FILE=REGISTRY ABB=ON	PLU=ON	618-21-3/RN
L15	6	SEA FILE=REGISTRY ABB=ON	PLU=ON	PHOSPHONOBENZOIC ACID?/CNS
L17	103447	SEA FILE=REGISTRY ABB=ON	PLU=ON	BENZOIC ACID?/CNS AND SULFO?/CNS
L18	638	SEA FILE=REGISTRY ABB=ON	PLU=ON	L17 AND DIAMIN?/CNS
L19	2	SEA FILE=REGISTRY ABB=ON	PLU=ON	L18 AND 1/NR
L20	28	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L12
L21	1	SEA FILE=REGISTRY ABB=ON	PLU=ON	L15 AND 1/NR
L22	28	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L21
L23	28	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L20 OR L22
L24	1	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L19 OR L4
L30	9	SEA FILE=HCAPLUS ABB=ON	PLU=ON	PHENYLENEDIAMINE? (3A) SULFO ? (5A) CARBOXY?
L31	43	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L23 OR L24 OR L30 OR L11
L32	2	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L31 AND (PROTON CONDUCT? OR ELECTROLYT?)
L33	1	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L31 AND ELECTRO?/SC, SX
L34	3	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L32 OR L33
L35	4	SEA FILE=HCAPLUS ABB=ON	PLU=ON	L24 OR L34

=> d que 139

L36	0	SEA FILE=WPIX ABB=ON	PLU=ON	PHOSPHONOBENZOIC ACID?
L37	1	SEA FILE=WPIX ABB=ON	PLU=ON	CARBOXYPHENYLPHOSPHONIC?
L38	1	SEA FILE=WPIX ABB=ON	PLU=ON	CARBOXYPHENYLSULFONIC ACID?
L39	2	SEA FILE=WPIX ABB=ON	PLU=ON	{L36 OR L37 OR L38}

=> d que 142

L40	1	SEA FILE=COMPENDEX ABB=ON	PLU=ON	CARBOXYPHENYLPHOSPHONIC?
L41	0	SEA FILE=COMPENDEX ABB=ON	PLU=ON	CARBOXYPHENYLSULFONIC ACID?
L42	1	SEA FILE=COMPENDEX ABB=ON	PLU=ON	L40 OR L41

=> d que 143

L40	1	SEA FILE=COMPENDEX ABB=ON	PLU=ON	CARBOXYPHENYLPHOSPHONIC?
L41	0	SEA FILE=COMPENDEX ABB=ON	PLU=ON	CARBOXYPHENYLSULFONIC ACID?
L43	0	SEA FILE=PASCAL ABB=ON	PLU=ON	L40 OR L41

=> d que 144

L40	1	SEA FILE=COMPENDEX ABB=ON	PLU=ON	CARBOXYPHENYLPHOSPHONIC?
L41	0	SEA FILE=COMPENDEX ABB=ON	PLU=ON	CARBOXYPHENYLSULFONIC ACID?
L44	1	SEA FILE=JAPIC ABB=ON	PLU=ON	L40 OR L41

=> dup rem 135 139 142 143 144

L43 HAS NO ANSWERS

FILE 'HCAPLUS' ENTERED AT 08:18:10 ON 23 FEB 2008  
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 PLEASE SEE "HELP USAGETERMS" FOR DETAILS.  
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FILE 'WPIX' ENTERED AT 08:18:10 ON 23 FEB 2008  
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FILE 'COMPENDEX' ENTERED AT 08:18:10 ON 23 FEB 2008  
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FILE 'JAPIO' ENTERED AT 08:18:10 ON 23 FEB 2008  
 COPYRIGHT (C) 2008 Japanese Patent Office (JPO)- JAPIO  
 PROCESSING COMPLETED FOR L35  
 PROCESSING COMPLETED FOR L39  
 PROCESSING COMPLETED FOR L42  
 PROCESSING COMPLETED FOR L43  
 PROCESSING COMPLETED FOR L44

L45 8 DUP REM L35 L39 L42 L43 L44 (0 DUPLICATES REMOVED)  
 ANSWERS '1-4' FROM FILE HCAPLUS  
 ANSWERS '5-6' FROM FILE WPIX  
 ANSWER '7' FROM FILE COMPENDEX  
 ANSWER '8' FROM FILE JAPIO

=> d 1-8 ibib ed abs hitstr hitind

L45 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN  
 ACCESSION NUMBER: 2002:384342 HCAPLUS Full-text  
 DOCUMENT NUMBER: 136:386895  
 TITLE: Ion-conducting phosphonic acid-containing  
 polyazoles  
 INVENTOR(S): Nakao, Junko; Sakaguchi, Yoshimitsu; Kitamura,  
 Kota; Takase, Satoshi; Hamamoto, Shiro; Tatemori,  
 Hiroshi  
 PATENT ASSIGNEE(S): Toyobo Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	-----
JP 2002146016	A	20020522	JP 2000-348325	20001115
PRIORITY APPLN. INFO.:			JP 2000-348325	20001115

ED Entered STN: 23 May 2002

AB Polyazoles have 3% weight loss temperature >400° determined by TGA based on the weight at 200° during heating and average mol. weight 1000-1,000,000. Thus, 3,5-dicarboxyphenylphosphonic acid-3,3',4,4'-tetraaminodiphenyl sulfone copolymer was prepared

IC ICM C08G073-06

ICS C08J005-22; H01B001-06; H01M008-02; C08L079-04

CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 52

ST polyazole ion conductor heat resistance;  
**carboxyphenylphosphonic acid aminodiphenyl sulfone copolymer**

L45 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2008 ACS ON STN

ACCESSION NUMBER: 1997:547413 HCAPLUS Full-text

DOCUMENT NUMBER: 127:150206

TITLE: Asymmetrical triphenodioxazine reactive dyes and their use

INVENTOR(S): Inoue, Masato; Hada, Junya; Araki, Toshiyuki

PATENT ASSIGNEE(S): Sumitomo Chemical Co., Ltd., Japan

SOURCE: Ger. Offen., 26 pp.

CODEN: GWXXBX

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

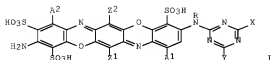
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 19702537	A1	19970731	DE 1997-19702537	19970124
JP 09202788	A	19970805	JP 1996-10425	19960124
JP 3317120	B2	20020826		
US 5837869	A	19981117	US 1997-788816	19970123
CH 691971	A5	20011215	CH 1997-156	19970123
GB 2309462	A	19970730	GB 1997-1495	19970124
GB 2309462	B	19980429		
US 5977358	A	19991102	US 1998-115593	19980715
PRIORITY APPLN. INFO.:			JP 1996-10425	A 19960124

OTHER SOURCE(S): MARPAT 127:150206

ED Entered STN: 28 Aug 1997

GI



I

AB The dyes (I; A1 = Cl-4-alkyl, Cl-4-alkoxy, Br, Cl, CO2H; A2 = H, Cl-4-alkyl, Cl-4-alkoxy, Br, Cl, CO2H; R = H, optionally substituted lower alkyl; X, Y = halogen, optionally substituted lower alkoxy, amino optionally containing a vinyl sulfone or potential vinyl sulfone group; Z1, Z2 = H, Br, Cl, Cl-4-alkyl, Cl-4-alkoxy, PhO) are suitable for dyeing or printing of fibrous materials. I have good Cl resistance. Thus, 1,4-phenylenediamine-2,6-disulfonic acid was condensed with 1,4-phenylenediamine-2-methoxy-5-sulfonic acid and chloranil to give a dianilide which was cyclocondensed to provide an asym. triphenodioxazine. This dye was then treated with cyanuric chloride, taurine, and 3-(β-sulfatoethylsulfonyl)aniline to yield a reactive dye (λmax 595 nm), fast reddish blue on cotton.

IT 193205-93-5, 1,4-Phenylenediamine-2-carboxy-5-sulfonic acid  
 (starting material; asym. triphenodioxazine reactive dye preparation and

application to cotton)

RN 193205-93-5 HCAPLUS

CN Benzoic acid, 2,5-diamino-4-sulfo- (CA INDEX NAME)



IC ICM C09B062-04  
ICS C09B019-02; D06P001-382  
ICA C07D498-04; C07D251-26  
CC 41-5 (Dyes, Organic Pigments, Fluorescent Brighteners, and Photographic Sensitizers)  
Section cross-reference(s): 40  
IT 107-35-7, Taurine 108-77-0, Cyanuric chloride 118-75-2, Chloranil, reactions 488-48-2, Bromanil 675-14-9, Cyanuric chloride 2494-88-4, 3-( $\beta$ -Sulfatoethylsulfonyl)aniline 6409-48-9, 1,4-Phenylenediamine-2,6-disulfonic acid 6409-55-8, 1,4-Phenylenediamine-2-methoxy-5-sulfonic acid 100959-37-3, 1,4-Phenylenediamine-2-methyl-5-sulfonic acid **193205-93-5**, 1,4-Phenylenediamine-2-carboxy-5-sulfonic acid 193205-94-6, 1,4-Phenylenediamine-2-chloro-5-sulfonic acid 193205-95-7, 1,4-Phenylenediamine-3-methyl-2,6-disulfonic acid (starting material; asym. triphenodioxazine reactive dye preparation and application to cotton)

L45 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1955:42715 HCAPLUS Full-text

DOCUMENT NUMBER: 49:42715

ORIGINAL REFERENCE NO.: 49:8162a-f

TITLE: The electrical effect of the diethoxyphosphinyl group

AUTHOR(S): Freedman, Leon D.; Jaffe, H. H.

CORPORATE SOURCE: Univ. of North Carolina, Chapel Hill

SOURCE: Journal of the American Chemical Society (1955), 77, 920-1

CODEN: JACSAT; ISSN: 0002-7863

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

ED Entered STN: 22 Apr 2001

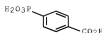
AB The m- and p-isomers of the compds. YC6H4P(O)(OEt)2 (I), where Y = CO<sub>2</sub>H, OH, and NH<sub>2</sub>, have been prepared, and their acid (or base) dissociation consts. have been determined and the  $\sigma$  values have been calculated (Y, pK<sub>a</sub>, and  $\sigma$  given): p-CO<sub>2</sub>H (II), 3.60, 0.60; p-NH<sub>2</sub> (III).H<sup>+</sup>, 2.22, 0.84; p-OH (IV), 8.28, 0.73; m-CO<sub>2</sub>H (V), 3.65, 0.55; m-NH<sub>2</sub> (VI).H<sup>+</sup>, 3.09, 0.53; m-OH (VII), 8.66, 0.56. V (11.4 g.) and 37 g. PCl<sub>5</sub> heated gently, the resulting POCl<sub>3</sub> and excess PCl<sub>5</sub> distilled off, the residue treated with 15 cc. CCl<sub>4</sub>, the solution treated with 37 cc. absolute EtOH, the CCl<sub>4</sub> and excess EtOH distilled off, and the residue distilled gave 79% I with Y = m-EtO<sub>2</sub>C (VIII), b<sub>0.3</sub> 137-49°. In the same manner was prepared the p-isomer of VIII, 80%, b<sub>0.3</sub> 143-7°. By the same method except that 2.1 moles PCl<sub>5</sub> was used/mole phosphonic acid were prepared I with Y = m-NO<sub>2</sub> (IX), 79%, b<sub>0.2</sub> 133-7°; and I with Y = p-NO<sub>2</sub> (X), 88%, b<sub>0.3</sub> 139-44°. VIII (5.77 g.) in 40 cc. EtOH and 40.9 cc. 0.49N NaOH kept about 24 hrs. at room temperature, the solution concentrated in vacuo to about 30 cc. and filtered, the filtrate acidified to Congo red and extracted

with C6H6, and the extract filtered through paper and evaporated gave 92% V, m. 85-6°. Similarly was prepared II, m. 105-7°, in 93% yield. IX (15.2 g.) in 100 cc. absolute EtOH hydrogenated at 40 lbs. pressure over Raney Ni, the mixture filtered, the filtrate evaporated in vacuo, the residual sirup kept at -25° overnight, and the solid dissolved in warm C6H6, treated with C, and evaporated to dryness gave 95% III, m. 47-50°. x reduced similarly, the mixture filtered and diluted with 200 cc. H2O, the solution cooled to -25°, and the crystals dried in vacuo at 100° gave 76% VI, m. 115-19°. III (8.17 g.) in 35 cc. H2O and 10 cc. concentrated HCl diazotized at 0° with EtONO, the solution warmed until the N evolution ceased, the mixture extracted with C6H6, the extract reextd. with 10% aqueous Na2CO3, the aqueous alkaline extract acidified to Congo red and extracted with C6H6, the extract filtered and evaporated, and the oily residue crystallized at -25° gave 15% IV, m. 67-9°. VII, m. 93-4°, was prepared similarly in 47% yield.

IT 618-21-3P, Benzoic acid, p-phosphono-, ethyl esters  
(preparation of)

RN 618-21-3 HCAPLUS

CN Benzoic acid, 4-phosphono- (CA INDEX NAME)



CC 10 (Organic Chemistry)

IT Ionization

(electrolytic, of phenylphosphonic acid derivs.)

IT 618-21-3P, Benzoic acid, p-phosphono-, ethyl esters  
2175-86-2P, Phosphonic acid, [p-nitrophenyl]-, diethyl esters  
5337-19-9P, Phosphonic acid, [m-nitrophenyl]-, diethyl esters  
5732-17-2P, Benzoic acid, 2,4,6-triphenyl- 5962-37-8P, Propionic acid, 3,3'-mercuridi- 33733-31-2P, Phosphonic acid, [m-hydroxyphenyl]-, diethyl esters 33795-18-5P, Phosphonic acid, [p-hydroxyphenyl]-, diethyl esters 42822-57-1P, Phosphonic acid, [p-aminophenyl]-, diethyl ester 89277-85-0P, Phosphonic acid, [m-aminophenyl]-, diethyl ester  
(preparation of)

L45 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN

ACCESSION NUMBER: 1953:46750 HCAPLUS [Full-text](#)

DOCUMENT NUMBER: 47:46750

ORIGINAL REFERENCE NO.: 47:7866f-h

TITLE: The acid dissociation constants of aromatic phosphonic acids. I. Meta- and para-substituted compounds

AUTHOR(S): Jaffe, H. H.; Freedman, Leon D.; Doak, G. O.

CORPORATE SOURCE: Univ. N. Carolina, Chapel Hill

SOURCE: Journal of the American Chemical Society (1953), 75, 2209-11

CODEN: JACSAT; ISSN: 0002-7863

DOCUMENT TYPE: Journal

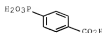
LANGUAGE: Unavailable

ED Entered STN: 22 Apr 2001

AB The acid dissociation consts. were determined by potentiometric titration in H2O and in 50% EtOH for 25 compds. or ions of the formula RC6H4PO3H2, where R is: m-(NH2Me) +, m-(NH2Et) +, p-NO2, m-NO2, p-SO2NH2, p-COOH, m-Br, m-Cl, m-COOH, p-Br, p-Cl, p-COO-, m-OH, m-COO-, H, p-SET, p-NHAc, m-NH2, m-NHET, m-

NHMe, m-NH(CH<sub>2</sub>)<sub>3</sub>Me, m-NHNH<sub>2</sub>, 3,4-CH<sub>2</sub>O<sub>2</sub>, p-Me, p-OH, p-OEt, p-NH<sub>2</sub>, p-NHNH<sub>2</sub>, and p-NHMe. The data show that Hammett's equation applies and that the derived reaction consts. are close to unity. The values of the reaction consts. depend on the polarizabilities of the central atoms of the acid functions. The structures of amino-phosphonic acids are discussed.

IT 618-21-3, Benzoic acid, p-phosphono-  
(and ions of, ionization of)  
RN 618-21-3 HCAPIJUS  
CN Benzoic acid, 4-phosphono- (CA INDEX NAME)



CC 2 (General and Physical Chemistry)  
IT Ionization  
(electrolytic, of phosphonic acid m- and p- derivs.)  
IT 618-21-3, Benzoic acid, p-phosphono- 14899-31-1, Benzoic  
acid, m-phosphono-  
(and ions of, ionization of)

=> d 5-6 full

L45 ANSWER 5 OF 8 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN  
AN 2004-357915 [34] WPIX Full-text  
DNC C2004-135781 [34]  
DNN N2004-286271 [34]  
TI Polymer electrolyte membrane for use, e.g. in fuel cells, obtained by  
heating a mixture of phosphonated aromatic polyazole monomers in  
polyphosphoric acid and then processing to form a self-supporting  
membrane  
DC A26; A85; L03; X16  
IN BENICEWICZ B; CALUNDANN G; CHOE E W; KIEFER J; SANSONE M; UENSAL O  
PA (CELA-C) CELANESE VENTURES GMBH; (PEME-N) PEMEAS GMBH; (BENI-I)  
BENICEWICZ B; (CALU-I) CALUNDANN G; (CHOE-I) CHOE E W; (KIEF-I) KIEFER  
J; (SANS-I) SANSONE M; (UENS-I) UENSAL O  
CYC 34  
PI DE 10246459 A1 20040415 (200434)\* DE 29[0]  
WO 2004033079 A2 20040422 (200434) DE  
EP 1554032 A2 20050720 (200547) DE  
US 20060008690 A1 20060112 (200605) EN  
JP 2006501991 W 20060119 (200607) JA 48  
CN 1726071 A 20060125 (200639) ZH  
KR 2005073477 A 20050713 (200643) KO  
ADT DE 10246459 A1 DE 2002-10246459 20021004; CN 1726071 A CN  
2003-80100918 20031002; EP 1554032 A2 EP 2003-775169 20031002; WO  
2004033079 A2 WO 2003-EP10906 20031002; EP 1554032 A2 WO 2003-EP10906  
20031002; US 20060008690 A1 WO 2003-EP10906 20031002; JP 2006501991 W  
WO 2003-EP10906 20031002; JP 2006501991 W JP 2004-542403 20031002; US  
20060008690 A1 US 2005-530002 20050822; KR 2005073477 A WO  
2003-EP10906 20031002; KR 2005073477 A KR 2005-705878 20050404  
FDT EP 1554032 A2 Based on WO 2004033079 A; JP 2006501991 W Based  
on WO 2004033079 A; KR 2005073477 A Based on WO 2004033079 A  
PRAI DE 2002-10246459 20021004  
IC ICM C08J005-22

IPCI B01D0061-42 [I,C]; B01D0061-44 [I,A]; B01D0069-00 [I,C]; B01D0069-12 [I,A]; B01D0071-00 [I,C]; B01D0071-00 [I,C]; B01D0071-62 [I,A]; B01D0071-62 [I,A]; B01D0071-82 [I,A]; C08G0073-00 [I,C]; C08G0073-06 [I,A]; C08J0005-20 [I,C]; C08J0005-22 [I,A]; H01B0001-06 [I,A]; H01M0004-86 [I,A]; H01M0004-86 [I,C]; H01M0008-02 [I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]

IPCR B01D0071-00 [I,C]; B01D0071-62 [I,A]; B01D0071-82 [I,A]; C08G0073-00 [I,C]; C08G0073-18 [I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]

EPC B01D0071-62; B01D0071-82; C08G0073-18; H01M0008-10E2

NCL NCLM 429/033.000

NCLS 429/042.000; 429/314.000; 521/027.000

AB DE 10246459 A1 UPAB: 20060121

NOVELTY - Proton-conducting, polyazole-based polymer membranes are obtained by heating a mixture of (hetero)aromatic monomers (tetra-amino compounds and polycarboxylic acids, or diamino-carboxylic acids, at least some of which have phosphonic acid groups) in polyphosphoric acid at up to 350degreesC and then processing to form a self-supporting membrane.

DETAILED DESCRIPTION - A proton-conducting polymer membrane containing polyazoles with phosphonic acid groups, obtained by (A) mixing (hetero)aromatic tetra-amino compounds with (hetero)aromatic carboxylic acids containing at least two acid groups (or their derivatives), where at least part of the amino and/or acid compounds have at least one phosphonic acid group, or mixing (hetero)aromatic diaminocarboxylic acids (at least part of which contains phosphonic acid groups) in polyphosphoric acid (PPA) to form a solution and/or dispersion, (B) heating at up to 350degreesC under inert gas to form polyazoles, (C) coating the mixture from (A) and/or (B) onto a support and (D) treating the membrane thus formed until it is self-supporting.

INDEPENDENT CLAIMS are also included for

(1) electrodes with a conductive polymer coating, obtained by the above process but using an electrode as the support in step (C)

(2) membrane-electrode units comprising electrode(s) and membrane(s) as above

(3) fuel cells containing such membrane-electrode units

USE - In membrane-electrode units, especially for use in fuel cells.

Other applications include electrolysis, condensers and battery systems.

ADVANTAGE - Polymer-electrolyte membranes with a high level of efficiency (especially high conductivity over a wide temperature range, even without added moisture), enabling the production of fuel cells which can be operated at low temperature (e.g. 80degreesC) without a considerable reduction in service life. These membranes are produced by a simple, low-cost method, without using expensive solvents such as dimethylacetamide which are difficult to remove.

TECH ORGANIC CHEMISTRY - Preferred Starting Materials: Phosphonated tetra-amines of formula (H2N)4ArYpZr (A) and acids of formula (XOC)2ArYpZr (B), and possibly also corresponding compounds with sulfonic acid groups, in which

Ar = a (hetero)aromatic group;

Y = a single bond or a group with 1-20 carbon atoms;

p, r = 1-4;

Z = groups of formula -PO3H2 or -C(R1)(PO3H2)2 and/or groups of formula -SO3H or -C(R1)(SO3H)2;

X = halogen or OR2;

R1, R2 = H or a 1-20C group

. Preferred compounds comprise (a) 3,3',4,4'-tetra-amino-biphenyl, 2,3,5,6-tetra-amino-pyridine and/or 1,2,4,5-tetra-aminobenzene; (b) (hetero)aromatic di-acids or their derivatives, e.g. phthalic, isophthalic, terephthalic acids and various substituted derivatives thereof, diphenic acid, naphthalenedicarboxylic acids, benzophenone-4,4'-dicarboxylic acid, biphenyl-4,4'-dicarboxylic acid, 4-carboxycinnamic acid etc. (35 di-acids listed); (c) 2,3-diamino-5 -

carboxyphenylphosphonic acid and 2,3- or 3,4-diamino-6-carboxy-phenylphosphonic acid; (d) sulfonic acids corresponding to (c); (e) tri- or tetra-carboxylic and their derivatives, especially e.g. trimellitic, trimellitic, benzene-1,2,4,5-tetracarboxylic or naphthalene-1,2,4,5-tetracarboxylic acid etc. (14 acids listed), in amounts of 0-30 (preferably 0.5-10) mol% based on the amount of di-acid; (f) heteroaromatic acids, preferably pyridine-2,5-, -3,5-, -2,6- or -2,4-dicarboxylic acid, similar derivatives of pyrazole, pyrimidine, pyrazine or benzimidazole, pyridine-2,4,6-tricarboxylic acid, etc. (10 acids listed); (g) diaminobenzoic acids and/or their mono- and di-hydrochlorides.

POLYMERS - Preferred Method: The solution prepared in step (A) and/or (B) may also contain dispersed and/or suspended polymer. Step (B) involves heating after forming a sheet of material as in (C). Step (D) involves treatment for 10 seconds to 300 hours at 0-150degreesC in presence of moisture, and the membrane obtained after (D) is crosslinked by the action of oxygen. A layer with a thickness of 20-4000 microns is formed in step (C) and the membrane formed in (D) has a thickness of 15-3000 microns. Electrodes made by this method have a conductive polymer coating with a thickness of 2-3000 microns.

FS CPI; EPI

MC CPI: A05-J02; A12-E06; L03-E04A2

EPI: X16-C01C; X16-E06A; X16-F02; X16-J01A

L45 ANSWER 6 OF 8 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN

AN 2004-357912 [34] WPIX Full-text

DNC C2004-135780 [34]

DNN N2004-286268 [34]

TI Polymer electrolyte membrane for use, e.g. in fuel cells, manufactured by heating a mixture of sulfonated aromatic polyazole monomers in polyphosphoric acid and then processing to form a self-supporting membrane

DC A26; A85; L03; X16

IN BENICIEWICZ B; CALUNDANN G; CHOE E W; KIEFER J; SANSONE M; UENSAL O; BENICIEWIEZ B

PA (CELA-C) CELANESE VENTURES GMBH; (PEME-N) PEMEAS GMBH; (BENI-I) BENICIEWIEZ B; (CALU-I) CALUNDANN G; (CHOE-I) CHOE E W; (KIEF-I) KIEFER J; (SANS-I) SANSONE M; (UENS-I) UENSAL O

CYC 34

PI DE 10246373 A1 20040415 (200434)\* DE 25[0]

WO 2004034499 A2 20040422 (200434) DE

EP 1552574 A2 20050713 (200546) DE

JP 2006502265 W 20060119 (200607) JA 40

CN 1720632 A 20060111 (200639) ZH

KR 2005073475 A 20050713 (200643) KO

US 20060183012 A1 20060817 (200655) EN

ADT DE 10246373 A1 DE 2002-10246373 20021004; CN 1720632 A CN

2003-80100919 20031002; EP 1552574 A2 EP 2003-748106 20031002; WO

2004034499 A2 WO 2003-EP10904 20031002; EP 1552574 A2 WO 2003-EP10904

20031002; JP 2006502265 W WO 2003-EP10904 20031002; KR 2005073475 A WO

2003-EP10904 20031002; JP 2006502265 W JP 2004-542401 20031002; KR

2005073475 A KR 2005-705875 20050404; US 20060183012 A1 WO

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FDT EP 1552574 A2 Based on WO 2004034499 A; JP 2006502265 W Based

on WO 2004034499 A; KR 2005073475 A Based on WO 2004034499 A

PRAI DE 2002-10246373 20021004

IC ICM C08J005-22

IPCI C08G0073-00 [I,C]; C08G0073-06 [I,A]; C08J0005-20 [I,C]; C08J0005-20

[I,C]; C08J0005-22 [I,A]; C08J0005-22 [I,A]; H01B0001-06 [I,A];

H01M0004-86 [I,A]; H01M0004-86 [I,C]; H01M0008-02 [I,A]; H01M0008-10



[I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C];  
 IPCR B01D0071-00 [I,C]; B01D0071-62 [I,A]; B01D0071-82 [I,A]; C08G0073-00  
 [I,C]; C08G0073-18 [I,A]; H01M0008-10 [I,A]; H01M0008-10 [I,C]  
 EPC B01D0071-62; B01D0071-82; C08G0073-18; C08J0005-22B2D; H01M0008-10E2  
 AB DE 10246373 A1 UPAB: 20060121

NOVELTY - Proton-conducting, polyazole-based polymer membranes are obtained by heating a mixture of (hetero)aromatic monomers (tetra-amino compounds and polycarboxylic acids, or diamino-carboxylic acids, at least some of which have sulfonic acid groups) in polyphosphoric acid at up to 350degreesC and then processing to form a self-supporting membrane.

DETAILED DESCRIPTION - A proton-conducting polymer membrane containing polyazoles with sulfonic acid groups, obtained by (A) mixing (hetero)aromatic tetra-amino compounds with (hetero)aromatic carboxylic acids containing at least two acid groups (or their derivatives), where at least part of the amino and/or acid compounds have at least one sulfonic acid group, or mixing (hetero)aromatic diaminocarboxylic acids (at least part of which contains sulfonic acid groups) in polyphosphoric acid (PPA) to form a solution and/or dispersion, (B) heating at up to 350degreesC under inert gas to form polyazoles, (C) coating the mixture from (B) onto a support and (D) treating the membrane thus formed until it is self-supporting. INDEPENDENT CLAIMS are also included for

(1) electrodes with a conductive polymer coating, obtained by the above process but using an electrode as the support in step (C)

(2) membrane-electrode units comprising electrode(s) and membrane(s) as above

(3) fuel cells containing such membrane-electrode units

USE - In membrane-electrode units, especially for use in fuel cells. Other applications include electrolysis, condensers and battery systems.

ADVANTAGE - Polymer-electrolyte membranes with a high level of efficiency (especially high conductivity over a wide temperature range, especially at high temperature without added moisture), enabling the production of fuel cells which can be operated at low temperature (e.g. 80degreesC) without a considerable reduction in service life. These membranes are produced by a simple, low-cost method, without using expensive solvents such as dimethylacetamide which are difficult to remove.

TECH ORGANIC CHEMISTRY - Preferred Starting Materials: Amines of formula (H2N)4ArYpZr (A) and acids of formula (XOC)2ArYpZr (B), in which

Ar = a (hetero)aromatic group;

Y = a single bond or a group with 1-20 carbon atoms;

p, r = 1-4;

Z = a group of formula -SO3H or -C(R1)(SO3H)2;

X = halogen or OR2;

R1, R2 = H or a 1-20C group

. Preferred compounds comprise:

(a) 3,3,4,4-tetra-amino-biphenyl, 2,3,5,6-tetra-amino-pyridine and/or 1,2,4,5-tetra-aminobenzene;

(b) (hetero)aromatic di-acids or their derivatives, e.g. phthalic, isophthalic, terephthalic acids and various substituted derivatives thereof, diphenic acid, naphthalenedicarboxylic acids, benzophenone-4,4-dicarboxylic acid, biphenyl-4,4-dicarboxylic acid, 4-carboxycinnamic acid etc. (35 di-acids listed);

(c) 2,3-diamino-5-carboxyphenylsulfonic acid and 2,3- or 3,4-diamino-6-carboxyphenylsulfonic acid;

(d) tri- or tetra-acids and their derivatives, especially e.g. trimesic, trimellitic, benzene-1,2,4,5-tetracarboxylic or naphthalene-1,2,4,5-tetracarboxylic acid etc. (14 acids listed), in amounts of 0-30 (preferably 0.5-10) mol% based on the amount of di-acid;

(e) heteroaromatic acids, preferably pyridine-2,5-, -3,5-, -2,6- or -2,4-dicarboxylic acid, similar derivatives of pyrazole, pyrimidine,

pyrazine or benzimidazole, pyridine-2,4,6-tricarboxylic acid, etc. (10 acids listed);

(f) diaminobenzoic acids and/or their mono- and di-hydrochlorides.

POLYMERS - Preferred Method: The solution prepared in step (A) may also contain dispersed and/or suspended polymer. Step (B) involves heating after forming a sheet of material as in (C). Step (D) involves treatment for 10 seconds to 300 hours at 0-150degreesC in presence of moisture, and the membrane obtained after (D) is crosslinked by the action of oxygen. A layer with a thickness of 20-4000 microns is formed in step (C) and the membrane formed in (D) has a thickness of 15-3000 microns. Electrodes made by this method have a conductive polymer coating with a thickness of 2-3000 microns.

FS CPI; EPI

MC CPI: A05-J02; A12-E06; L03-E04A2

EPI: X16-C01C; X16-E06A; X16-F02; X16-J01A

-> d 7-8 ibib abs ind

L45 ANSWER 7 OF 8 COMPENDEX COPYRIGHT 2008 EEI on STN

ACCESSION NUMBER: 2007(12):16296 COMPENDEX Full-text

TITLE: Synthesis and characterization of new strontium 4-carboxyphenylphosphonates.

AUTHOR: Zima, Vitezslav (Joint Laboratory of Solid State Chemistry the Institute of Macromolecular Chemistry Academy of Sciences, 532 10 Pardubice, Czech Republic); Svoboda, Jan; Benes, Ludvik; Melanova, Klara; Trchova, Miroslava; Dybal, Jiri

SOURCE: Journal of Solid State Chemistry v 180 n 3 March 2007 2007.p 929-939

SOURCE: Journal of Solid State Chemistry v 180 n 3 March 2007 2007.p 929-939

CODEN: JSSCBI ISSN: 0022-4596 E-ISSN: 1095-726X

PUBLICATION YEAR: 2007

DOCUMENT TYPE: Journal

TREATMENT CODE: Experimental

LANGUAGE: English

AN 2007(12):16296 COMPENDEX Full-text

AB Several new strontium 4-carboxyphenylphosphonates, i.e., two modifications of  $\text{Sr}(\text{HOCC}_6\text{H}_4\text{PO}_3)_2$ ,  $\text{SrH}(\text{OCC}_6\text{H}_4\text{PO}_3) \cdot \text{H}_2\text{O}$ ,  $\text{Sr}_3(\text{OCC}_6\text{H}_4\text{PO}_3)_2 \cdot 4\text{H}_2\text{O}$  and  $\text{Sr}_3(\text{OCC}_6\text{H}_4\text{PO}_3)_2 \cdot 5.7\text{H}_2\text{O}$  were prepared and characterized by elemental analysis, thermogravimetry, X-ray powder diffraction and infrared spectroscopy. It was found that the compositions of these compounds depend on the acidity of the reaction medium. In addition, the presented compounds are interconvertible in dependence on pH. The position of the acid hydrogen atom in  $\text{SrH}(\text{OCC}_6\text{H}_4\text{PO}_3) \cdot \text{H}_2\text{O}$  was determined from the IR spectra of the studied compounds. The structure of the beta modification of  $\text{Sr}(\text{HOCC}_6\text{H}_4\text{PO}_3)_2$  was solved from its X-ray powder diffraction pattern using an ab initio method (the FOX program) with subsequent Rietveld refinement in the FULLPROF program. The compound is monoclinic, with the space group  $\text{P}2_1/\text{c}$  (No.14),  $a=49.88(2)$ ,  $b=7.867(2)$ ,  $c=5.602(3)$  Å,  $\beta=128.68(2)^\circ$ , and  $Z=4$ . It has a one-dimensional structure with an inorganic part built of  $\text{SrO}_8$  distorted tetragonal antiprisms. \$COPY 2007 Elsevier Inc. All rights reserved. 31 Refs.

AN 2007(12):16296 COMPENDEX Full-text

CC 549.2 Alkaline Earth Metals; 801 Chemistry; 801.1 Chemistry (General); 802.2 Chemical Reactions; 931.3 Atomic and Molecular Physics; 941.4 Optical Variables Measurements

CT \*Strontium; Reaction kinetics; Rietveld refinement; X ray powder diffraction; pH effects; Thermogravimetric analysis; Infrared

spectroscopy

ST Metal phosphonates; **Carboxyphenylphosphonic** acid; Inorganic organic hybrid compounds; Chain compounds; Layered compounds

ET C\*H\*O\*P\*Sr; Sr(HOCC6H4PO3H); Sr cp; cp; H cp; O cp; C cp; P cp; C\*H\*O\*Sr; SrH(OCC6H; O\*P; PO; H\*O; H2O; Sr; H\*O\*P; H4PO; H; O; SrH(OCC6H4PO; P; O\*Sr; SrO

L45 ANSWER 8 OF 8 JAPIO (C) 2008 JPO on STN

ACCESSION NUMBER: 2005-220064 JAPIO Full-text

TITLE: **CARBOXYPHENYLPHOSPHONIC** ESTER COMPOUND  
AND METHOD FOR PRODUCING THE SAME

INVENTOR: SUZUKI HIDEO; KAWAMURA YASUO

PATENT ASSIGNEE(S): NISSAN CHEM IND LTD

PATENT INFORMATION:

PATENT NO	KIND	DATE	ERA	MAIN IPC
JP 2005220064	A	20050818	Heisei	C07F009-40

## APPLICATION INFORMATION

STN FORMAT: JP 2004-28961 20040205

ORIGINAL: JP2004028961 Heisei

PRIORITY APPLN. INFO.: JP 2004-28961 20040205

SOURCE: PATENT ABSTRACTS OF JAPAN (CD-ROM), Unexamined Applications, Vol. 2005

AN 2005-220064 JAPIO Full-text

AB PROBLEM TO BE SOLVED: To provide **carboxyphenylphosphonic** ester compounds each useful as a monomer for flame-retardant and heat-resistant polymeric materials or as a raw material for other organic materials, and to provide respective methods for producing the compounds.

SOLUTION: These **carboxyphenylphosphonic** ester compounds are a **carboxyphenylphosphonic** dialkyl ester compound, a **carboxyphenylphosphonic** monoalkyl ester compound and an alkoxycarbonylphenylphosphonic monoalkyl ester compound, represented by formula[1], formula[2] and formula[3], respectively (in these formulae, R(SP>1</SP>, R(SP>2</SP> and R(SP>3</SP> are each a 1-20C alkyl; and (n) is an integer of 1 or 2). The respective methods for producing these compounds are also provided. COPYRIGHT: (C)2005,JPO&NCIPI

IC ICM C07F009-40

ICA C07B061-00

-> d his nofile

(FILE 'HOME' ENTERED AT 07:21:39 ON 23 FEB 2008)

FILE 'HCAPLUS' ENTERED AT 07:21:53 ON 23 FEB 2008

L1 1 SEA ABB=ON PLU=ON US20060008690/PN

FILE 'REGISTRY' ENTERED AT 07:22:26 ON 23 FEB 2008

E C7H8N2O5S/MF  
 L2 90 SEA ABB=ON PLU=ON C7H8N2O5S/MF  
 L3 88 SEA ABB=ON PLU=ON L2 AND 1/NR  
 L4 2 SEA ABB=ON PLU=ON L3 AND DIAMI?  
 E CARBOXYPHENYLPHOSPHONIC ACID/CN  
 L5 1 SEA ABB=ON PLU=ON 13590-36-2/RN  
 E 2,3-DIAMINO-5-CARBOXYPHENYLPHOSPHONIC ACID/CN  
 E C7H8N2O5P/MF  
 L6 0 SEA ABB=ON PLU=ON DIAMINO7/CNS AND CARBOXYPHENYLPHOSPHONI  
 C ACID7/CNS  
 L7 0 SEA ABB=ON PLU=ON DIAMINO7/CNS AND CARBOXYPHENYLPHOSPHONI  
 C ACID7/CNS  
 L8 0 SEA ABB=ON PLU=ON DIAMINO7/CNS AND CARBOXYPHENYL  
 PHOSPHONIC ACID7/CNS  
 L9 0 SEA ABB=ON PLU=ON DIAMINO7/CNS AND CARBOXYPHEN7/CNS  
 PHOSPHONIC ACID7/CNS  
 L10 0 SEA ABB=ON PLU=ON CARBOXYPHENYLPHOSPHONIC7/CNS

FILE 'HCAPLUS' ENTERED AT 07:29:56 ON 23 FEB 2008

L11 17 SEA ABB=ON PLU=ON CARBOXYPHENYLPHOSPHONIC?

FILE 'REGISTRY' ENTERED AT 07:31:21 ON 23 FEB 2008

L12 1 SEA ABB=ON PLU=ON 618-21-3/RN  
 E C7H9N2O5P/MF  
 L13 18 SEA ABB=ON PLU=ON C7H9N2O5P/MF  
 L14 0 SEA ABB=ON PLU=ON L13 AND DIAMI?  
 L15 6 SEA ABB=ON PLU=ON PHOSPHONOBENZOIC ACID7/CNS  
 L16 0 SEA ABB=ON PLU=ON CARBOXYPHENYLSULFONIC ACID7/CNS  
 L17 103447 SEA ABB=ON PLU=ON BENZOIC ACID7/CNS AND SULFO7/CNS  
 L18 638 SEA ABB=ON PLU=ON L17 AND DIAMIN7/CNS  
 L19 2 SEA ABB=ON PLU=ON L18 AND 1/NR

FILE 'HCAPLUS' ENTERED AT 07:37:08 ON 23 FEB 2008

L20 28 SEA ABB=ON PLU=ON L12

FILE 'REGISTRY' ENTERED AT 07:37:34 ON 23 FEB 2008

L21 1 SEA ABB=ON PLU=ON L15 AND 1/NR

FILE 'HCAPLUS' ENTERED AT 07:37:45 ON 23 FEB 2008

L22 28 SEA ABB=ON PLU=ON L21  
 L23 28 SEA ABB=ON PLU=ON L20 OR L22  
 L24 1 SEA ABB=ON PLU=ON L19 OR L4  
 L25 0 SEA ABB=ON PLU=ON CARBOXYPHENYLSULFONIC ACID?  
 L26 0 SEA ABB=ON PLU=ON CARBOXYPHENYLSULFONIC?  
 L27 577 SEA ABB=ON PLU=ON PHENYLENEDIAMINE? (3A) SULFO?  
 L28 71 SEA ABB=ON PLU=ON L27 AND CARBOXY?  
 L29 40 SEA ABB=ON PLU=ON PHENYLENEDIAMINE? (3A) SULFO? (L) CARBOXY?  
 L30 9 SEA ABB=ON PLU=ON PHENYLENEDIAMINE? (3A) SULFO? (5A) CARBOXY?  
 L31 43 SEA ABB=ON PLU=ON L23 OR L24 OR L30 OR L11  
 L32 2 SEA ABB=ON PLU=ON L31 AND (PROTON CONDUCT? OR ELECTROLYT?

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      )
L33      1 SEA ABB=ON   PLU=ON   L31 AND ELECTRO?/SC, SX
L34      3 SEA ABB=ON   PLU=ON   L32 OR L33
L35      4 SEA ABB=ON   PLU=ON   L24 OR L34

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L36      0 SEA ABB=ON   PLU=ON   PHOSPHONOBENZOIC ACID?
L37      1 SEA ABB=ON   PLU=ON   CARBOXYPHENYLPHOSPHONIC?
L38      1 SEA ABB=ON   PLU=ON   CARBOXYPHENYLSULFONIC ACID?
L39      2 SEA ABB=ON   PLU=ON   (L36 OR L37 OR L38)

      FILE 'COMPENDEX' ENTERED AT 08:14:10 ON 23 FEB 2008
L40      1 SEA ABB=ON   PLU=ON   CARBOXYPHENYLPHOSPHONIC?
L41      0 SEA ABB=ON   PLU=ON   CARBOXYPHENYLSULFONIC ACID?
L42      1 SEA ABB=ON   PLU=ON   L40 OR L41

      FILE 'PASCAL' ENTERED AT 08:15:00 ON 23 FEB 2008
L43      0 SEA ABB=ON   PLU=ON   L40 OR L41

      FILE 'JAPIO' ENTERED AT 08:15:22 ON 23 FEB 2008
L44      1 SEA ABB=ON   PLU=ON   L40 OR L41

      FILE 'RCAPLUS, WPIX, COMPENDEX, JAPIO' ENTERED AT 08:18:10 ON 23 FEB
2008
L45      8 DUP REM L35 L39 L42 L43 L44 (0 DUPLICATES REMOVED)

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